UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/091,738	03/06/2002	Stewart R. Wyatt	10018462-1	8159

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EXAMINER
LAMARRE, GUY J

ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 06/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	**Applicant(s)**
Office Action Summary	10/091,738	WYATT ET AL.
	Examiner	**Art Unit**	
	Guy J. Lamarre	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A. SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _07 March 2005_.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-21_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-21_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on _03/06/02_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____.

        3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

FINAL OFICCE ACTION

Response to Amendment

.   This office action is in response to Applicants' amendment of *7 March 2005*.

.   **Claims 1-4, 6-9** and **16-18** are amended; **Claim 21** is added. **Claims 1-21** remain

pending.

.   The objections and rejections under 35 USC 101 & 112 of record are withdrawn in

response to Applicants' amendment.

.   The prior art claim rejections of record are maintained in response to Applicants'

amendment.

Response to Arguments

*   Applicants' arguments have been fully considered, but are not deemed persuasive because

the claimed erasure feature is disclosed by **Glover** as underlined in para. 3 below, and because

Glover does not restrict error code capability setting threshold as alleged by applicants

Claim Objections

1.   **Claim 18** is objected to because said **Claim** shall end in a period. Correction is required.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the **second** paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming
> the subject matter which the applicant regards as his invention.

2.1   Claims 2, 16-17, 18-19, 21 are rejected under the second paragraph of 35 U.S.C. 112

because there is a lack of antecedent basis for 'selecting' and said host/said request in respective

Claims 2, 18 and intervening Claims 19, 22.

*   it is not clear to the **Examiner how 'a system is stored in a computer readable**

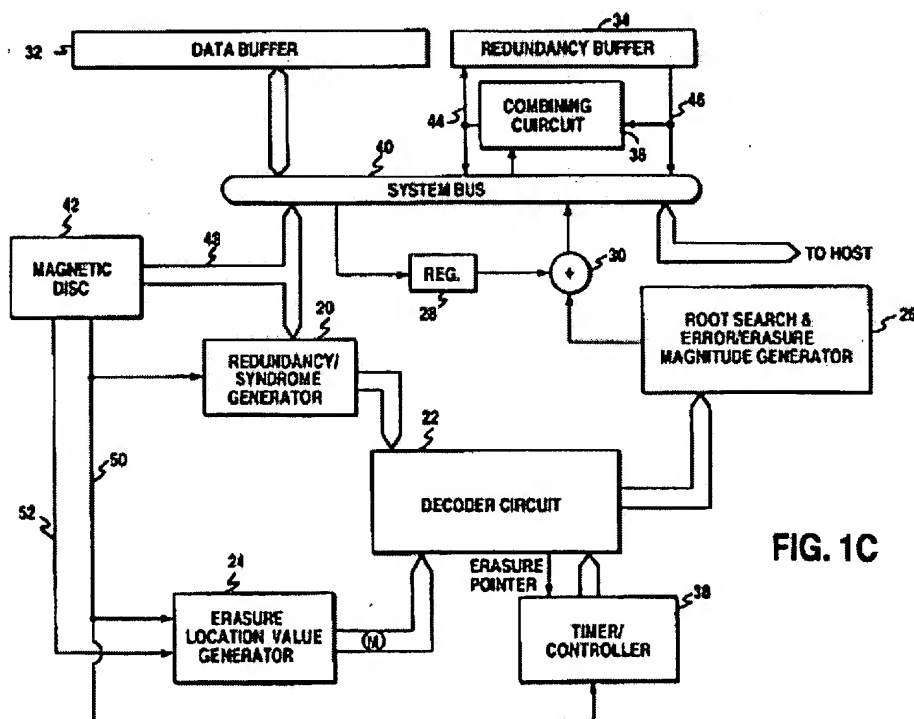**medium'** in **Claim 16** and intervening Claim 17.

· *   it is not clear to the **Examiner** what is effected in **Claim 18** and intervening Claims 19,

22 via the host and the request. Due to the ambiguities and confusion in said **claims 18** and

intervening **Claims 19, 22**, no art has been applied thereto, see In re Steele, 49 CCPA 1295, 305

F.2d 859, 134 USPQ 292 (1962) and In re Wilson, 424 F.2d 1382, 165 USPQ 494(CCPA 1970).

The examiner will not speculate as to the intended meaning.

Claim Rejections - 35 USC § 102

3.   **Claims 1-17, 20** are rejected under 35 U.S.C. 102(b) as being anticipated by **Glover** (US
Patent No. 5,751,733; 12 May 1998).

As per Claims 1-17, 20, Glover discloses an equivalent data transfer pausing procedure

and configuration in *"Interleaved redundancy sector for correcting an unrecoverable sector in a disc*

storage device," as depicted in Fig. 1c and described in col. 6 line 10 et seq. *wherein,* when an error

threshold is reached, *a 'storage system <u>pauses the data transfer</u> and executes the track <u>level error</u>*

correction steps to recover the lost sector using the redundancy sector... ' along with the use of erasure

pointers.

FIG. 1C

Glover discloses the claimed system for pausing data transfer e.g., in col. 7 line 24 et

seq., and the verify command comprising: full error/erasure tracking means (col. 4 line 2 and

Fig. 1c: **Numerals 20, 24, 26**), sparing means in Fig.   4c: **Numeral 216),** error condition

threshold setting means along with compare means to evaluate match or mismatch with ECC

error capability, such as ECC error capability comprising means to detect/correct full errors and

erasures, e.g., in col. 7 line 22 et seq., data recovery at e.g., in Figs. 3c, 4b, 6a-6c and col. 7 lines

28, 30 et seq., write verify operation/command means in Figs. 4e-4f, 6a-6c, e.g., *"As mentioned*

above, there are two situations where a data sector on the disc may become unrecoverable. First, the

sector may become entirely unreadable due to an inability to synchronize to the sector data (because, for

example, the preamble 6 or sync mark 8 have been corrupted by a defect on the medium). The other

possibility is that the sector becomes uncorrectable; that is, the number of hard errors exceeds the error

correction capability of the sector level *ECS. In these situations, the storage system* pauses the data

transfer *and executes the track* level error *correction steps to recover the lost sector using the redundancy*

sector.

...The prior art track level error correction systems are limited to correcting only one unrecoverable data

sector per track because the redundancy sector is generated as the byte XOR of the respective data bytes

in the data sectors. This severely limits the benefit of using a redundancy sector, especially in cases where

a burst error spans two sectors, thereby rendering both sectors unrecoverable at the sector level and at

the track level. The present invention improves the error correction capability of the track level ECS by

dividing a sector into three interleaved codewords *and generating the redundancy sector by combining*

the respective symbols in each codeword *according to a predetermined error correction operation (e.g.,*

byte XOR)........This aspect of the present invention is understood with reference to FIG. 9 which shows

each data sector divided into three codewords, and the codewords *being combined (XORed) across three*

interleaves (designated INTLV 0, INTLV 1 and INTLV 2) to generate an interleaved redundancy sector.

The data sector itself is interleaved to generate the three codewords; *that is, symbol 0 is placed in the*

first codeword, symbol 1 is placed in the second codeword, symbol 2 is placed in the third codeword,

symbol 3 is placed in the first codeword, etc.. Then, sector level redundancy is generated for each of the

three codewords and stored in the data sector. Upon read back, the data symbols read from the disc are

de-interleaved into the three codewords and each codeword is processed by the sector level ECS

*separately. In this manner, the sector level ECS can generate **an erasure** pointer corresponding to an*

unrecoverable codeword within a sector (i.e., an unrecoverable codeword in INTLV0, INTLV1 or

*INTLV2). Using the **erasure** pointers, the track level ECS is capable of correcting a single unrecoverable*

codeword in each interleave, and the unrecoverable codewords can occur in different sectors. Thus, using

the interleave technique of the present invention, the track level ECS is capable of correcting up to three

unrecoverable data sectors containing a single uncorrectable codeword in separate interleaves.

...Preferably, the redundancy sector is generated according to: 2.sup.m --the sum modulo 2.sup.m of the

respective codeword symbols in an interleave (i.e., INTLV0, INTLV1 or INTLV2), where m is the size in

bits of a codeword symbol. Then, the track level error syndromes for correcting a codeword are

generated as the sum modulo 2.sup.m of the respective codeword symbols in an interleave, including the

redundancy sector codeword. The error syndromes are then used to correct a data codeword

*uncorrectable at the sector level that corresponds to the **erasure** pointer generated by the sector level*

*ECS. That is, the **erasure** pointer identifies the sector and interleave location of the uncorrectable*

*codeword, and the track level ECS uses **the erasure pointers** to correct up to three codewords in separate*

interleaves which can occur in three different sectors. '

Claim Rejections - 35 USC ' 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all
obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth
> in section 102 of this title, if the differences between the subject matter sought to be patented and the prior
> art are such that the subject matter as a whole would have been obvious at the time the invention was made
> to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be
> negatived by the manner in which the invention was made.

4.1   This application currently names joint inventors. In considering patentability of the
claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

4.2 **Claims 1-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Glover** and respective **Inouie et al.** (US Patent No. 5,712,861) and **Zook** (US Patent No. 5,600,662).

As per Claims 1-15, 20, Glover substantially discloses an equivalent data transfer pausing procedure and configuration. **Not specifically described** in detail by **Glover** is the step whereby an error threshold feature is selected for a code. **However Inouie,** in an analogous art, discloses such feature. {See **Inouie**, Id., col. 35 line 44 et seq.; or **Zook** at col. 27 line 47, col. 29 line 55 et seq.}. **Therefore,** it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the procedure of **Glover** by including therein an error threshold feature as taught by **Inouie** or **Zook,** because such modification would provide the procedure **Glover** with a method whereby system hardware can be optimized. {See **Inouie,** Id., col. 35 line 44 et seq.; **Zook** at col. 27 line 47, col. 29 line 55 et seq.}

Conclusion

.   Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action.   Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

.   Any response to this action should be mailed to:

Commissioner of Patents and Trademarks, Washington, D.C. 20231

or faxed to: (703) 872-9306 for all formal communications.

Hand-delivered responses should be brought to Customer Services, 220 20th Street S., Crystal

Plaza II, Lobby, Room 1B03, Arlington, VA 22202.

Any inquiry concerning this communication or earlier communications from the examiner should

be directed to Guy J. Lamarre, P.E., whose telephone number is (571) 272-3826. The examiner can

normally be reached on Monday to Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert

De Cady, can be reached at (571) 272-3819.

Information regarding the status of an application may also be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications may be

obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is

available through Private PAIR only. For more information about the PAIR system, see

http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the

Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Guy J. Lamarre, P.E
Primary Examiner
6/10/2005